REMARKS

Claims 9-12 and 27-35 are pending in this application.

Claims 13-26 have been canceled without prejudice to the filing of a divisional application, and claims 1-8 have been canceled without prejudice. Claims 31-35 have been added. The subject matter of claims 31-35 may be found in original claims 1-8 and in the specification and so are supported by the application as filed. No new matter has been added by these claims.

In Paper No. 111004, the Examiner issued a written restriction requirement between claims between the claims of Group I (claims 1-12 and 27-30) which are drawn to a composite material, allegedly classified in Class 442, subclass 179 and the claims of Group II (claims 13-26) which are drawn to a method of using a composite material, allegedly classified in Class 156, various subclasses. The Examiner takes the position that the inventions of Groups I and II are distinct, and that the invention of Group I is related to the invention of Group II as a process of as a product and a process for use. Specifically, the Examiner states that the product as claimed can be used as a layer in a molded material which does not comprise a metal layer.

The applicants do not necessarily agree with the Examiner's arguments in support of restriction, and believe that the Examiner would not be inconvenienced in searching both Groups of claims since searching for the product would likely involve searching for processes for its use within the search scope. However, in an effort to expedite prosecution of the application on the merits, applicants hereby confirm their election provided to the Examiner via telephone, without traverse, of the claims of Group I drawn to a composite material (claims 1-12 and 27-30) for examination on the merits.

The Examiner is respectfully requested to contact the undersigned on any questions which might arise at the telephone number indicated below.

Applicants further acknowledge and thank the Examiner for considering the references cited in the Information Disclosure Statement faxed to the Examiner and look forward to receiving the initialed copy of the SB/08/A form in the next communication from the Examiner.

The Examiner has rejected claims 1-12 and 27-30 as unpatentable under 35 U.S.C. §103(a) over U.S. Patent No. 4,992,323 of Vogelesang et al. ("Vogelesang"), U.S. Patent No. 5,126,192 Chellis ("Chellis") and U.S. Patent No. 4,291,084 of Segal ("Segal").

Applicants respectfully traverse the Examiner's §103(a) rejection of claims 1-12 and 27-30 and the arguments in support thereof and request reconsideration and withdrawal of the rejection based on the following remarks.

The Examiner cites Vogelesang for teaching a laminate having a metal layer which is bonded to a thermoplastic layer. The thermoplastic is asserted to include PEEK and a fibrous reinforcement such as a continuous filament, including carbon fiber. The Examiner acknowledges that Vogelesang does not teach using woven fiber reinforcement and does not teach that the coefficient of thermal expansion of the resin layer should match that of the metal layer. Chellis is cited for teaching that both woven and nonwoven fibrous reinforcement may be used to form composite materials having fiber reinforced resin layers and metal layers. Based on this, the Examiner takes the position that it would have been obvious to use a woven or nonwoven fabric as in Chellis in Vogelesang because Chellis teaches that such fabrics are suitable for use as the fibrous reinforcement in metal/resin laminates. The Examiner further takes the position that the weave patterns as claimed are known and the amount of fiber to use in the resin layer could be determined through routine experimentation. Segal is cited as teaching that when forming metal/composite laminates, the coefficient of thermal expansion of the metal and composite sheet should be the same. As a result, the Examiner argues that it would have been obvious to select the coefficient of thermal expansion of the composite sheet in Vogelesang to match the coefficient of thermal expansion of the metal layer based on Segal's teaching.

Applicants respectfully disagree with the Examiner's basis for rejection. Vogelesang is directed to thin layer laminates including thick thermoplastic core layers surrounded by thin metal sheets as outer surfaces (col. 1, lines 1-20). Metal within the laminates are thin metal sheets (1.5 mm or smaller for example) (col. 3, lines 12-20). Vogelesang further teaches that due to this thin size, the filaments used in the laminates are 5-25 microns and are arranged to extend parallel to each other essentially linearly, such as aramid or glass fibers (col. 3, lines 20-25). The metal sheets are aluminum (co. 3, lines 25-30). Thus, Vogelesang is directed to thin metal sheets and moldable thermoplastic laminate sheets of Vogelesang which are used for molding into parts such as auto body parts.

Applicants' claimed composites are useful as articles such as mechanical seal faces, thrust bearing pads, clutch faces, journal bearings and pads, brake pads, automotive parts and similar articles which require a metallic body and wear surface. Thus, the base metal as claimed in applicants' article is the substance of the article and the composite is provided as a wear surface thereto. (specification, paragraph 0043). The articles differ from Vogelesang in that the thermoplastic central layer which is thicker is a moldable sheet with thin metallic outer sheet layers – i.e., the thermoplastic is the body with metallic sheets as surfaces. The base metal as claimed is the base of an article (not a thin sheet) and can be formed of various metals – carbon steel being preferred (specification paragraph 0046). The surface of the metal is then prepared such as by grinding, sand blasting and roughing, which techniques would not be used on a thin sheet as in Vogelesang, and then the prepared surface of the claimed composite is provided with a woven composite wear layer. Note that in Vogelesang, in discussing pre-treatment of the metallic sheets prior to laminating, Vogelesang suggests treatments such as alkaline degreasing, etching in an acid bath, anodizing or applying a primer – not grinding, sand blasting and the like as would be done with a base metal which is the body of the article capable of being used for the wear applications noted above. Vogelesang is not providing a thermoplastic wear layer to a metallic body in the form of a base metal, but is doing the opposite – providing metallic sheets for an outer surface when molding a thermoformable automotive part from the inner thermoplastic layer.

Chellis is directed to formation of microelectronic materials for use in printed circuit boards (PCBs) that can have conductive layers. The material of interest is a PCT which includes a coupled inorganic hollow microsphere filled, reinforced polymer resin composite material with high thermal stability, flame retardance and a low dielectric constant. Such art is not analogous to formation of molded thermoplastic automotive body parts as in Vogelesang or metal bodies with wear surfaces for wear applications as noted above as in the claimed invention. Thus, Chellis is not properly combined with Vogelesang and does not suggest the claimed invention. Chellis expresses concerns on the effects of different types of woven reinforcement laminates in view of their dielectric properties and their effects on PCBs (col. 1, line 22 to col. 2, line 28). The thermal expansion coefficient is of concern with regard to whether it affects the dielectric properties and cracking of soldered PCB joints. Thus, after discouraging such woven fabric

uses, Chellis describes use of microspheres in composite form to adjust the dielectric properties (col. 4, lines 3-16).

In addition to being non-analogous arts directed to separate problems (Vogelesang being directed to physical properties for formation of automotive molded body parts and Chellis to formation of materials for PCBs with desired dielectric properties), Chellis in combination with Vogelesang also does not change the analysis above in terms of the distinction from the present invention. Chellis places thin copper sheets in a sandwich configuration around a cloth pre-preg having embedded microspheres designed to modify dielectric properties (col. 5, lines 20-30). Once again, the pre-preg and microspheres are the primary vehicle supporting the laminate with the thin sheets merely being placed around the pre-preg as a laminate surface for the PCB. The claimed invention provides a base metal as the body of the article with a composite as a wear surface thereon. In Chellis, further, the fabric is suggested based on thickness, Er, CTE and whether it functions as a vehicle for the targeted microspheres which are the basis of Chellis' invention.

Thus, one of ordinary skill in the art of forming moldable automotive body parts would not look to the microsphere vehicles for dielectric microspheres in a patent directed to PCB laminates for improved dielectric properties -- further supporting that these references are not properly combined. Even if they were properly combined, that they do not teach an article having a metal base which forms the body of the article having a composite wear surface directly adhered thereon.

Segal is directed to forming thermoplastic laminated sheets which can incorporate reinforcement, but maintain good surface appearance (col. 1, line 20 to col. 2, lines 10). Segal goes on to state that thermal expansion characteristics are a problem for avoiding warpage in thermoplastic laminates. Segal also mentions that the laminates of Segal should be selected with equivalent thermoplastic expansion coefficients in the event the Segal laminates are bonded by glue of fasteners to a sheet of metal (col. 3, lines 51-69). Segal does not teach directly press laminating a metallic body in the form of a base metal to a woven laminate which functions as a wear surface for an article as claimed. Segal is also not addressed to achieving desired dielectric properties or providing metallic sheet laminates for automotive body part use and so one of ordinary skill in the art would not look to Segal in forming the laminates of Vogelesang and/or Chellis. As a result, Segal is not properly combined with these references. It further does not

add to or alter the above analysis of the invention in view of Vogelesang and Chellis such that the present invention is not *prima facie* obvious over the cited combination. None of these references also provides a basis for a reasonable expectation of success in that even if the coefficients of linear expansion were matched in Vogelesang and/or Chellis, the laminate would still be a thermoplastic as a basis for the article of those references which is moldable with a metallic thin sheet as an outer surface and not the other way around, i.e., a base metal article having a composite sheet as a wear surface thereon.

In view of the foregoing, applicants respectfully submit that the pending claims are patentably distinct over the prior art relied on by the Examiner in her § 103(a) rejection and are in condition for allowance. A Notice of Allowance is respectfully requested.

Respectfully submitted,

GEORGE RAWA ET AL.

5/19/05 By: _____
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